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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/048,234

09/11/2003

Par Gellerfors

GELLERFORS2

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1444 7590 10/20/2006

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EXAMINER

SCHNIZER, RICHARD A

ART UNIT

PAPER NUMBER

1635

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/048,234

Applicant(s)

GELLERFORS ET AL.

Examiner

Richard Schnizer, Ph. D.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 9-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-8 and 12-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

An amendment was received on 9/18/06. Applicant's election without traverse of group 1 is acknowledged. Claims 9-11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claims 1-17 are pending.

Claims 1-8 and 12-17 are under consideration in this Office Action.

### ***Compliance with Sequence Rules***

This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). However, this application fails to comply with the requirements of 37 CFR 1.821 through 1.825 for the following reason(s). Applicant's attention is directed to the final rule making notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998). Figure 36 is objected to because it contains nucleic acid sequences, but neither the Figure nor the brief description contains any SEQ ID NO: associated with the sequences.

If these sequences are listed in the current Sequence Listing, then the specification should be amended to include the appropriate SEQ ID NO in each of the passages referred to above. If these sequences are not in the current Sequence Listing, then Applicant must provide:

A substitute computer readable form (CRF) copy of the "Sequence Listing".

A substitute paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification.

A statement that the content of the paper and computer readable copies are the same and, where applicable, include no new matter, as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g) or 1.825(b) or 1.825(d).

### ***Specification/Drawings***

The specification and/or drawings are objected to because the brief description of the drawings does not accurately correspond to the drawings. The brief description refers to Figures 37 A and B, but there are no such Figures in the Application. Further, there are descriptions for 52 Figures, but the application only contains 49 drawing sheets, the last 11 of which have had their Fig. Nos. lined through with no replacement Fig. Nos.

### ***Claim Objections***

Claim 1 is objected to because it recites acronyms without first defining the acronyms. Claim 1 should be amended to replace "rhPBGD" with "recombinant human porphobilinogen deaminase (rhPBGD)", and to replace "PBGD" with "porphobilinogen deaminase (PBGD)". Claim 1 would be clearer if at least some of the steps required to perform the homologous recombination were set forth, for example:

Claim 1 is also objected to because it recites "A production strain" even though it is directed to one specific strain (Accession No 12915). Substitution of "the" for "an" is suggested.

Claim 7 is objected to for a similar reason. It is drawn to a single, specific expression plasmid, and so it should recite "The expression plasmid", and not "An expression plasmid".

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because it is unclear to what the "Accession No" refers. "Deutsche Sammlung von Mikroorganism und Zelulturen (DSMZ)" should be inserted immediately before "Accession No."

Claims 2-6 are indefinite because they recite "the transformed host cell" without antecedent basis. Note also that there is no step for transfecting the host cell with the vector, and the PBGD encoded by the vector is not limited to human PBGD. As a result the claims are incomplete because they omit essential elements and steps, such omission amounting to a gap between the elements steps. See MPEP § 2172.01.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Delfau et al (J. Clin. Invest. 86: 1511-1516, 1990).

Delfau taught a method of purifying rhPBGD expressed in E. coli. Expression vectors encoding “normal” or either of two variants of human PBGD were transfected into E.coli, the bacteria were grown, harvested, disrupted by sonication, and rhPBGD was separated from E. coli PBGD by ion exchange chromatography. See abstract, and page 1513, column 1, second full paragraph. Activity was measured as a function of pH. See Table II on page 1515.

Claim 6 is included in this rejection because although Delfau does not disclose the precise sequence of the normal PBGD, the fact that it is labeled as “normal” conveys to one of skill in the art that it is wild type PBGD. Absent evidence to the contrary the PBGD encoded by SEQ ID NOS: 3 and 4 is wild type PBGD. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an Applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. See *In re Ludtke*, 441 F.2d 660, 169 USPQ 563 (CCPA 1971). Whether the rejection is based on “inherency” under 35 USC 102, on

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"prima facie obviousness" under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. In re Best, Bolton, and Shaw, 195 USPQ 430, 433 (CCPA 1977) citing In re Brown, 59 CCPA 1036, 459 F.2d 531, 173 USPQ 685 (1972).

Claims 2, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al (J. Clin. Invest. 94: 1927-1937, 1994).

Chen taught a method of expressing rhPBGD in E. coli. Expression vectors encoding "normal" or either mutant human PBGD were transfected into E.coli, the bacteria were grown, harvested, and cell extracts were isolated. Isolation of cell extracts is considered to be a purification step. See abstract, and page 1929, column 2, first full paragraph and Table II at page 1933.

Claim 6 is included in this rejection because although Chen does not disclose the precise sequence of the normal PBGD, the fact that it is labeled as "normal" conveys to one of skill in the art that it is wild type PBGD. Absent evidence to the contrary the PBGD encoded by SEQ ID NOS: 3 and 4 is wild type PBGD. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an Applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product, as discussed above.

Claims 2, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ong et al (Mol. Cell. Probes 11: 293-296: 1997).

Ong taught a method of expressing rhPBGD in E. coli. Expression vectors encoding "normal" or either mutant human PBGD were transfected into E.coli, the bacteria were grown, harvested, and enzyme isolated was isolated for assay. See abstract; last paragraph on page 294; Table 1 on page 295; and first full paragraph of column 2 on page 295.

Claim 6 is included in this rejection because although Ong does not disclose the precise sequence of the normal PBGD, the fact that it is labeled as "normal" conveys to one of skill in the art that it is wild type PBGD. Absent evidence to the contrary the PBGD encoded by SEQ ID NOS: 3 and 4 is wild type PBGD. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an Applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product, as discussed above.

Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Scott et al (FEBS Lett. 242(2): 319-324, 1989).

Scott taught a hemB<sup>-</sup> E. coli strain that produced PBGD apoenzyme. Porphobilinogen deaminase is an enzyme that catalyses the polymerization of porphobilinogen (PBG) to form preuroporphobilinogen (hydroxymethylbilane). The



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enzyme comprises a prosthetic group composed of a PBG attached to a cysteine at position 242, and a second PBG attached to the first PBG. The catalyzed reaction involves the stepwise, linear addition of 4 more PBGs, and subsequent cyclization and release of preuroporphobilinogen. This results in regeneration of the enzyme. The hemB<sup>-</sup> E. coli strain of Scott fails to produce PBG, but does produce PBGD apoenzyme. Because the strain does not produce PBG, the PBGD apoenzyme cannot obtain the PBG prosthetic group required for activity, so the bacterial strain does not produce an active PBGD. See abstract; the last two sentences of the paragraph bridging columns 1 and 2 on page 319; and lines 1-11 of item 3 on page 321. Thus Scott anticipates the claim.

Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Fraser et al (Science 270: 397-403, 1995).

Fraser et al taught the entire genome of bacterium *Mycoplasma genitalium*. Absent evidence to the contrary, this bacterium lacks any gene encoding PGBD. The only gene related to heme and porphyrin metabolism contained by *Mycoplasma genitalium* is a gene encoding protoporphyrinogen oxidase. See Table 1, at page 399, column 1, under "Biosynthesis of cofactors, prosthetic groups, and carriers". *Mycoplasma genitalium* is considered to be genetically modified because it is a product of evolution.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (J. Clin. Invest. 94: 1927-1937, 1994) in view of Makrides et al (Micro. Rev. 60(3): 512-538, 1996).

Chen taught a method of expressing rhPBGD in E. coli. Expression vectors encoding "normal" or either mutant human PBGD were transfected into E.coli, the bacteria were grown, harvested, and cell extracts were isolated. Isolation of cell extracts is considered to be a purification step. See abstract, and page 1929, column 2, first full paragraph and Table II at page 1933.

Chen did not teach a fermentation step or the use of a His Tag purification tag.

Makrides described strategies for achieving high expression of genes in E. coli and improved methods for isolation of the proteins. Makrides states that protein "production in E. coli can be increased significantly through the use of high density culture systems", i.e. fermentation systems. See paragraph bridging pages 525 and 526. Makrides also describes the use of fusion proteins including His-Tag proteins (see Table III). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a fermentation step in the method of Chen because Makrides indicated that one could increase protein production through the use of fermentation. It would

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have been similarly obvious to use a His Tag to aid in the purification of the rhPBGD.

One would have been motivated to do so in order to easily separate the rhPBGD from any contaminating bacterial PBGD so as to obtain accurate activity measurements.

Thus the invention as a whole was prima facie obvious.

### ***Double Patenting***

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1, 7, and 8 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 3, 1, and 2, respectively, of prior U.S. Patent No. 6,537,777.

This is a double patenting rejection.

Claim 3 of '777 is:

The rhPBGD production strain (DSM Accession No. 12915) obtained by use of the DNA fragment, Eco RI-Hind III linear fragment as shown in Seq. ID NO 2 to obtain hemC-deletion in the host JM105-H-R6-C by homologous gene replacement and transforming the resulting strain with the expression plasmid pExp1-M2-Bb to yield the final production strain which is free from production of PBGD of non human origin.

As such it is coextensive in scope with instant claim 1.

Claim 1 of '777 is:

The expression plasmid pExp1-M2-BB as shown in Seq. ID NO 1.

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SEQ ID NO:1 from '777 is identical to instant SEQ ID NO:1 so '777 claim 1 is coextensive in scope with instant claim 7.

Claim 2 of '777 is:

The DNA fragment of Seq. ID NO 2, capable of obtaining hemC-deletion in a host.

SEQ ID NO:2 of '777 is identical to instant SEQ ID NO:2, so '777 claim 2 is coextensive in scope with instant claim 8.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 2-6, and 12-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3-13 of U.S. Patent No. 6,537,777. Although the conflicting claims are not identical, they are not patentably distinct from each other.

Instant claims 2-6 embrace methods of producing rhPBGD by providing a vector encoding a PBGD, culturing a transformed host cell under conditions facilitating expression of the nucleic acid sequence, and recovering the expression product from the culture. Claim 3 adds a fermentation step. Claim 4 requires a purification step. Claim 5 that purification is performed with a His-Tag and the expression product is a fusion protein (rhPBGD-His) comprising a human PBGD and a His-Tag. Claim 6 requires that eh rhPBGD is encoded by SEQ ID NO:3 or 4. Claim 14 is drawn to methods of producing rhPBGD comprising cultivating a cell that does not produce PBGD of non-human origin, and that does produce rhPBGD.

Claims 4-13 of '777 are drawn to a method of producing a protein comprising a sequence selected from SEQ ID NOS: 3-11, comprising a) providing a transformed host cell transformed with a recombinant DNA molecule encoding a human PBGD selected from SEQ ID NOS: 3-11; b) culturing the transformed host cell under conditions facilitating expression of the nucleic acid sequence; and c) recovering the expression product. Claim 5 requires a fermentation step. Claim 6 requires a further purification step. Claim 7 requires that purification is performed with a His-Tag and the expression product is a fusion protein (rhPBGD-His) comprising a human PBGD and a His-Tag. Claim 8 limits the rhPBGD to SEQ ID NO:3. Claims 10 and 11 require that the transformed cell does not express non-human PBGD.

Note that instant SEQ ID NOS: 3 and 4 are identical to SEQ ID NOS: 3 and 4 from '777. See alignments below. For these reasons, the claims of '777 are considered to anticipate and render obvious claims 2-6 and 14 of '777. Note that this is an

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obviousness type double patenting rejection due to the indefiniteness of instant claims

2-6. Should claim 2 be amended to require that the recited host cell is transformed with the recited vector, then a statutory double patenting rejection will be required for dependent claim 6 because its entire scope will be clearly anticipated by claim 4 of the '777 patent.

Instant claims 12 and 13 are anticipated and rendered obvious by at least '777 claim 1.

Instant claims 14-17 are drawn to methods of obtaining a bacterial cell of instant claim 12 with an expression vector comprising an expressible nucleic acid sequence encoding recombinant human PBGD.

Claim 3 of '777 is:

The rhPBGD production strain (DSM Accession No. 12915) obtained by use of the DNA fragment, Eco RI-Hind III linear fragment as shown in Seq. ID NO 2 to obtain hemC-deletion in the host JM105-H-R6-C by homologous gene replacement and transforming the resulting strain with the expression plasmid pExp1-M2-Bb to yield the final production strain which is free from production of PBGD of non human origin.

Because '777 claim 3 states precisely how to make the claimed bacterium, it renders obvious instant claims 14-17.

### ***Conclusion***

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner(s) should be directed to Richard Schnizer, whose telephone number is 571-272-0762. The examiner can normally be reached Monday through Friday between the

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hours of 6:00 AM and 3:30. The examiner is off on alternate Fridays, but is sometimes in the office anyway.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Peter Paras, can be reached at (571) 272-4517. The official central fax number is 571-273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

A handwritten signature in black ink, appearing to read 'Richard Schnizer', with a long horizontal line extending to the right.

Richard Schnizer, Ph.D.  
Primary Examiner  
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**Alignment of SEQ ID NO:1 from '777 with instant SEQ ID NO:1:**

Query	1	GAATTCCTAACATAAGTTAAGGAGGAAAAAAAAAATGAGAGTTATTCGTGTCGGTACCCGCA	60
Sbjct	1	GAATTCCTAACATAAGTTAAGGAGGAAAAAAAAAATGAGAGTTATTCGTGTCGGTACCCGCA	60
Query	61	AGAGCCAGCTTGCTCGCATACAGACGGACAGTGTGGTGGCAACATTGAAAGCCTCGTACC	120
Sbjct	61	AGAGCCAGCTTGCTCGCATACAGACGGACAGTGTGGTGGCAACATTGAAAGCCTCGTACC	120
Query	121	CTGGCCTGCAGTTTGAAATCATTGCTATGTCCACCACAGGGGACAAGATTCTTGATACTG	180
Sbjct	121	CTGGCCTGCAGTTTGAAATCATTGCTATGTCCACCACAGGGGACAAGATTCTTGATACTG	180
Query	181	CACCTCTCTAAGATTGGAGAGAAAAGCCTGTTTACCAAGGAGCTTGAACATGCCCTGGAGA	240
Sbjct	181	CACCTCTCTAAGATTGGAGAGAAAAGCCTGTTTACCAAGGAGCTTGAACATGCCCTGGAGA	240
Query	241	AGAATGAAGTGGACCTGGTTGTTCACTCCTTGAAGGACCTGCCCACCTGTGCTTCCTCCTG	300
Sbjct	241	AGAATGAAGTGGACCTGGTTGTTCACTCCTTGAAGGACCTGCCCACCTGTGCTTCCTCCTG	300
Query	301	GCTTCACCATCGGAGCCATCTGCAAGCGGGAAAACCCTCATGATGCTGTTGTCTTTCACC	360
Sbjct	301	GCTTCACCATCGGAGCCATCTGCAAGCGGGAAAACCCTCATGATGCTGTTGTCTTTCACC	360
Query	361	CAAAATTTGTTGGGAAGACCCTAGAAACCCTGCCAGAGAAGAGTGTGGTGGGAACCAGCT	420
Sbjct	361	CAAAATTTGTTGGGAAGACCCTAGAAACCCTGCCAGAGAAGAGTGTGGTGGGAACCAGCT	420
Query	421	CCCTGCGAAGAGCAGCCCAGCTGCAGAGAAAGTTCCCGCATCTGGAGTTCAGGAGTATTC	480
Sbjct	421	CCCTGCGAAGAGCAGCCCAGCTGCAGAGAAAGTTCCCGCATCTGGAGTTCAGGAGTATTC	480
Query	481	GGGGAAACCTCAACACCCGGCTTCGGAAGCTGGACGAGCAGCAGGAGTTCAGTGCCATCA	540
Sbjct	481	GGGGAAACCTCAACACCCGGCTTCGGAAGCTGGACGAGCAGCAGGAGTTCAGTGCCATCA	540
Query	541	TCCTGGCAACAGCTGGCCTGCAGCGCATGGGCTGGCACAACCGGGTTGGGCAGATCCTGC	600
Sbjct	541	TCCTGGCAACAGCTGGCCTGCAGCGCATGGGCTGGCACAACCGGGTTGGGCAGATCCTGC	600
Query	601	ACCCTGAGGAATGCATGTATGCTGTGGGCCAGGGGGCCTTGGGCGTGGAAGTGCGAGCCA	660
Sbjct	601	ACCCTGAGGAATGCATGTATGCTGTGGGCCAGGGGGCCTTGGGCGTGGAAGTGCGAGCCA	660
Query	661	AGGACCAGGACATCTTGGATCTGGTGGGTGTGCTGCACGATCCCGAGACTCTGCTTCGCT	720
Sbjct	661	AGGACCAGGACATCTTGGATCTGGTGGGTGTGCTGCACGATCCCGAGACTCTGCTTCGCT	720
Query	721	GCATCGCTGAAAGGGCCTTCTTGAGGCACCTGGAAGGAGGCTGCAGTGTGCCAGTAGCCG	780
Sbjct	721	GCATCGCTGAAAGGGCCTTCTTGAGGCACCTGGAAGGAGGCTGCAGTGTGCCAGTAGCCG	780



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Query	781	TGCATACAGCTATGAAGGATGGGCAACTGTACCTGACTGGAGGAGTCTGGAGTCTAGACG	840
Sbjct	781	TGCATACAGCTATGAAGGATGGGCAACTGTACCTGACTGGAGGAGTCTGGAGTCTAGACG	840
Query	841	GCTCAGATAGCATACAAGAGACCATGCAGGCTACCATCCATGTCCC TGCCAGCATGAAG	900
Sbjct	841	GCTCAGATAGCATACAAGAGACCATGCAGGCTACCATCCATGTCCC TGCCAGCATGAAG	900
Query	901	ATGGCCCTGAGGATGACCCACAGTTGGTAGGCATCACTGCTCGTAACATTCCACGAGGGC	960
Sbjct	901	ATGGCCCTGAGGATGACCCACAGTTGGTAGGCATCACTGCTCGTAACATTCCACGAGGGC	960
Query	961	CCCAGTTGGCTGCCCAGAACTTGGGCATCAGCCTGGCCAACTTGTTGCTGAGCAAAGGAG	1020
Sbjct	961	CCCAGTTGGCTGCCCAGAACTTGGGCATCAGCCTGGCCAACTTGTTGCTGAGCAAAGGAG	1020
Query	1021	CCAAAAACATCCTGGATGTTGCACGGCAATTGAACGATGCCCATTAATAAGCTTGGCTGT	1080
Sbjct	1021	CCAAAAACATCCTGGATGTTGCACGGCAATTGAACGATGCCCATTAATAAGCTTGGCTGT	1080
Query	1081	TTTGGCGGATGAGAGAAGATTTTCAGCCTGATACAGATTAAATCAGAACGCAGAAGCGGT	1140
Sbjct	1081	TTTGGCGGATGAGAGAAGATTTTCAGCCTGATACAGATTAAATCAGAACGCAGAAGCGGT	1140
Query	1141	CTGATAAAACAGAATTTGCCTGGCGGCAGTAGCGCGGTGGTCCCACCTGACCCCATGCCG	1200
Sbjct	1141	CTGATAAAACAGAATTTGCCTGGCGGCAGTAGCGCGGTGGTCCCACCTGACCCCATGCCG	1200
Query	1201	AACTCAGAAGTGAAACGCCGTAGCGCCGATGGTAGTGTGGGGTCTCCCCATGCGAGAGTA	1260
Sbjct	1201	AACTCAGAAGTGAAACGCCGTAGCGCCGATGGTAGTGTGGGGTCTCCCCATGCGAGAGTA	1260
Query	1261	GGGAACTGCCAGGCATCAAATAAAACGAAAGGCTCAGTCGAAAGACTGGGCCTTTCGTTT	1320
Sbjct	1261	GGGAACTGCCAGGCATCAAATAAAACGAAAGGCTCAGTCGAAAGACTGGGCCTTTCGTTT	1320
Query	1321	TATCTGTTGTTTGTTCGGTGAACGCTCTCCTGAGTAGGACAAATCCGCCGGGAGCGGATTT	1380
Sbjct	1321	TATCTGTTGTTTGTTCGGTGAACGCTCTCCTGAGTAGGACAAATCCGCCGGGAGCGGATTT	1380
Query	1381	GAACGTTGCGAAGCAACGGCCCCGAGGGTGGCGGGCAGGACGCCCGCCATAAACTGCCAG	1440
Sbjct	1381	GAACGTTGCGAAGCAACGGCCCCGAGGGTGGCGGGCAGGACGCCCGCCATAAACTGCCAG	1440
Query	1441	GCATCAAATTAAGCAGAAGGCCATCCTGACGGATGGCCTTTTTGCGTTTCTACAAACTCT	1500
Sbjct	1441	GCATCAAATTAAGCAGAAGGCCATCCTGACGGATGGCCTTTTTGCGTTTCTACAAACTCT	1500
Query	1501	TTTGTTTTATTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGAT	1560
Sbjct	1501	TTTGTTTTATTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGAT	1560
Query	1561	AAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCC	1620

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Sbjct	1561	 AAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCC	1620
Query	1621	TTATTCCCTTTTTTGCGGCATTTCCTTGCTCACCAGAAACGCTGGTGA	1680
Sbjct	1621	TTATTCCCTTTTTTGCGGCATTTCCTTGCTCACCAGAAACGCTGGTGA	1680
Query	1681	AAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAGTGGGTACATCGAACTGGATCTCA	1740
Sbjct	1681	AAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAGTGGGTACATCGAACTGGATCTCA	1740
Query	1741	ACAGCGGTAAGATCCTTGAGAGTTTTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTT	1800
Sbjct	1741	ACAGCGGTAAGATCCTTGAGAGTTTTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTT	1800
Query	1801	TTAAAGTTCGCTATGTGGCGCGGTATTATCCCGTGTTGACGCCGGGCAAGAGCAACTCG	1860
Sbjct	1801	TTAAAGTTCGCTATGTGGCGCGGTATTATCCCGTGTTGACGCCGGGCAAGAGCAACTCG	1860
Query	1861	GTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGC	1920
Sbjct	1861	GTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGC	1920
Query	1921	ATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATA	1980
Sbjct	1921	ATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATA	1980
Query	1981	ACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTT	2040
Sbjct	1981	ACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTT	2040
Query	2041	TGCACAACATGGGGGATCATGTAACTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAG	2100
Sbjct	2041	TGCACAACATGGGGGATCATGTAACTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAG	2100
Query	2101	CCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCA	2160
Sbjct	2101	CCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCA	2160
Query	2161	AACTATTAACTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGG	2220
Sbjct	2161	AACTATTAACTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGG	2220
Query	2221	AGGCGGATAAAAGTTGCAGGACCACCTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTG	2280
Sbjct	2221	AGGCGGATAAAAGTTGCAGGACCACCTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTG	2280
Query	2281	CTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAG	2340
Sbjct	2281	CTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAG	2340
Query	2341	ATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATG	2400
Sbjct	2341	ATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATG	2400

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Query	2401	AACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAG	2460
Sbjct	2401	AACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAG	2460
Query	2461	ACCAAGTTTACTCATATATACTTTAGATTGATTTAAAAC TTCATTTTAAATTTAAAAGGA	2520
Sbjct	2461	ACCAAGTTTACTCATATATACTTTAGATTGATTTAAAAC TTCATTTTAAATTTAAAAGGA	2520
Query	2521	TCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAATCCCTTAACGTGAGTTTTTCGT	2580
Sbjct	2521	TCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAATCCCTTAACGTGAGTTTTTCGT	2580
Query	2581	TCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCnnnnnnnC	2640
Sbjct	2581	TCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTTC	2640
Query	2641	TGCGCGTAATCTGCTGCTTGCAAACAAAAAACCCACCGCTACCAGCGGTGGTTTGTTC	2700
Sbjct	2641	TGCGCGTAATCTGCTGCTTGCAAACAAAAAACCCACCGCTACCAGCGGTGGTTTGTTC	2700
Query	2701	CGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACGGCTTCAGCAGAGCGCAGATAC	2760
Sbjct	2701	CGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACGGCTTCAGCAGAGCGCAGATAC	2760
Query	2761	CAAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAAC TCTGTAGCAC	2820
Sbjct	2761	CAAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAAC TCTGTAGCAC	2820
Query	2821	CGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGT	2880
Sbjct	2821	CGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGT	2880
Query	2881	CGTGTCTTACC GGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCT	2940
Sbjct	2881	CGTGTCTTACC GGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCT	2940
Query	2941	GAACGGGGGGTTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGAT	3000
Sbjct	2941	GAACGGGGGGTTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGAT	3000
Query	3001	ACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGT	3060
Sbjct	3001	ACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGT	3060
Query	3061	ATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACG	3120
Sbjct	3061	ATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACG	3120
Query	3121	CCTGGTATCTTTATAGTCTGTCTGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGT	3180
Sbjct	3121	CCTGGTATCTTTATAGTCTGTCTGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGT	3180
Query	3181	GATGCTCGTCAGGGGGGCGGAGCCATGGA AAAACGCCAGCAACGCGGCC TTTTACGGT	3240

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Sbjct	3181	 GATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGT	3240
Query	3241	TCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCCCTGCGTTATCCCCTGATTCTG	3300
Sbjct	3241	TCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCCCTGCGTTATCCCCTGATTCTG	3300
Query	3301	TGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCG	3360
Sbjct	3301	TGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCG	3360
Query	3361	AGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCTGATGCGGTATTTTCTCCTTA	3420
Sbjct	3361	AGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCTGATGCGGTATTTTCTCCTTA	3420
Query	3421	CGCATCTGTGCGGTATTTACACCCGCATATGGTGCACCTCTCAGTACAATCTGCTCTGATG	3480
Sbjct	3421	CGCATCTGTGCGGTATTTACACCCGCATATGGTGCACCTCTCAGTACAATCTGCTCTGATG	3480
Query	3481	CCGCATAGTTAAGCCAGTATACTCCGCTATCGCTACAGATCCGGAACATAATGGTGCA	3540
Sbjct	3481	CCGCATAGTTAAGCCAGTATACTCCGCTATCGCTACAGATCCGGAACATAATGGTGCA	3540
Query	3541	GGGCGCTGACTTCCGCGTTTCCAGACTTTACGAAACACGGAAACCGAAGACCATTTCATGT	3600
Sbjct	3541	GGGCGCTGACTTCCGCGTTTCCAGACTTTACGAAACACGGAAACCGAAGACCATTTCATGT	3600
Query	3601	TGTTGCTCAGGTCGCAGACGTTTTGTCAGCAGCAGTCGCTTTCAGTTTCGCTCGCGTATCGG	3660
Sbjct	3601	TGTTGCTCAGGTCGCAGACGTTTTGTCAGCAGCAGTCGCTTTCAGTTTCGCTCGCGTATCGG	3660
Query	3661	TGATTCATTCTGCTAACCAGTAAGGCAACCCCGCCAGCCTAGCCGGGTCTCAACGACAG	3720
Sbjct	3661	TGATTCATTCTGCTAACCAGTAAGGCAACCCCGCCAGCCTAGCCGGGTCTCAACGACAG	3720
Query	3721	GAGCACGATCATGCGCACCCGTGGCCAGGACCCAACGCTGCCCCGAGATGCGCCGCGTGCG	3780
Sbjct	3721	GAGCACGATCATGCGCACCCGTGGCCAGGACCCAACGCTGCCCCGAGATGCGCCGCGTGCG	3780
Query	3781	GCTGCTGGAGATGGCGGACGCGATGGATATGTTCTGCCAAGGGTTGGTTTGCGCATTAC	3840
Sbjct	3781	GCTGCTGGAGATGGCGGACGCGATGGATATGTTCTGCCAAGGGTTGGTTTGCGCATTAC	3840
Query	3841	AGTTCTCCGCAAGAATTGATTGGCTCCAATTCTTGGAGTGGTGAATCCGTTAGCGAGGTG	3900
Sbjct	3841	AGTTCTCCGCAAGAATTGATTGGCTCCAATTCTTGGAGTGGTGAATCCGTTAGCGAGGTG	3900
Query	3901	CCGCCGGCTTCCATTTCAGGTTCAGGTGGCCCGGCTCCATGCACCGCGACGCAACGCGGGG	3960
Sbjct	3901	CCGCCGGCTTCCATTTCAGGTTCAGGTGGCCCGGCTCCATGCACCGCGACGCAACGCGGGG	3960
Query	3961	AGGCAGACAAGGTATAGGGCGGCGCCTACAATCCATGCCAACCCTTCCATGTGCTCGCC	4020
Sbjct	3961	AGGCAGACAAGGTATAGGGCGGCGCCTACAATCCATGCCAACCCTTCCATGTGCTCGCC	4020

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Query	4021	GAGGCGGCATAAAATCGCCGTGACGATCAGCGGTCCAGTGATCGAAGTTAGGCTGGTAAGA	4080
Sbjct	4021	GAGGCGGCATAAAATCGCCGTGACGATCAGCGGTCCAGTGATCGAAGTTAGGCTGGTAAGA	4080
Query	4081	GCCGCGAGCGATCCTTGAAGCTGTCCCTGATGGTCGTCATCTACCTGCCTGGACAGCATG	4140
Sbjct	4081	GCCGCGAGCGATCCTTGAAGCTGTCCCTGATGGTCGTCATCTACCTGCCTGGACAGCATG	4140
Query	4141	GCCTGCAACGCGGGCATCCCGATGCCGCCGGAAGCGAGAAGAATCATAATGGGGAAGGCC	4200
Sbjct	4141	GCCTGCAACGCGGGCATCCCGATGCCGCCGGAAGCGAGAAGAATCATAATGGGGAAGGCC	4200
Query	4201	ATCCAGCCTCGCGTCGCGAACGCCAGCAAGACGTAGCCCAGCGCTCGGCCGCCATGCCG	4260
Sbjct	4201	ATCCAGCCTCGCGTCGCGAACGCCAGCAAGACGTAGCCCAGCGCTCGGCCGCCATGCCG	4260
Query	4261	GCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCTTGA	4320
Sbjct	4261	GCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCTTGA	4320
Query	4321	GCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTCCAG	4380
Sbjct	4321	GCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTCCAG	4380
Query	4381	CGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTTGC	4440
Sbjct	4381	CGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTTGC	4440
Query	4441	ATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGAAG	4500
Sbjct	4441	ATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGAAG	4500
Query	4501	GAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTGACGCTCTCCCTTATGCGACTCC	4560
Sbjct	4501	GAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTGACGCTCTCCCTTATGCGACTCC	4560
Query	4561	TGCATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGAAGGAAT	4620
Sbjct	4561	TGCATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGAAGGAAT	4620
Query	4621	GGTGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCC	4680
Sbjct	4621	GGTGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCC	4680
Query	4681	ACGCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATG	4740
Sbjct	4681	ACGCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATG	4740
Query	4741	TCGGCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGT	4800
Sbjct	4741	TCGGCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGT	4800
Query	4801	CCGGCGTAGAGGATCCACAGGACGGGTGTGGTCGCCATGATCGCGTAGTCGATAGTGGCT	4860

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Sbjct	4801	 CCGGCGTAGAGGATCCACAGGACGGGTGTGGTCGCCATGATCGCGTAGTCGATAGTGGCT	4860
Query	4861	CCAAGTAGCGAAGCGAGCAGGACTGGGCGGCGGCCAAAGCGGTCGGACAGTGCTCCGAGA	4920
Sbjct	4861	CCAAGTAGCGAAGCGAGCAGGACTGGGCGGCGGCCAAAGCGGTCGGACAGTGCTCCGAGA	4920
Query	4921	ACGGGTGCGCATAGAAATTGCATCAACGCATATAGCGCTAGCAGCACGCCATAGTGA	4980
Sbjct	4921	ACGGGTGCGCATAGAAATTGCATCAACGCATATAGCGCTAGCAGCACGCCATAGTGA	4980
Query	4981	GCGATGCTGTTCGGAATGGACGATATCCCGCAAGAGGCCCGGCAGTACCGGCATAACCAAG	5040
Sbjct	4981	GCGATGCTGTTCGGAATGGACGATATCCCGCAAGAGGCCCGGCAGTACCGGCATAACCAAG	5040
Query	5041	CCTATGCCTACAGCATCCAGGGTGACGGTGCCGAGGATGACGATGAGCGCATTTGTTAGAT	5100
Sbjct	5041	CCTATGCCTACAGCATCCAGGGTGACGGTGCCGAGGATGACGATGAGCGCATTTGTTAGAT	5100
Query	5101	TTCATACACGGTGCCTGACTGCGTTAGCAATTTAACTGTGATAAACTACCGCATTAAGC	5160
Sbjct	5101	TTCATACACGGTGCCTGACTGCGTTAGCAATTTAACTGTGATAAACTACCGCATTAAGC	5160
Query	5161	TAATCGATGATAAGCTGTCAAACATGAGTGATCCGGGCTTATCGACTGCACGGTGCACCA	5220
Sbjct	5161	TAATCGATGATAAGCTGTCAAACATGAGTGATCCGGGCTTATCGACTGCACGGTGCACCA	5220
Query	5221	ATGCTTCTGGCGTCAGGCAGCCATCGGAAGCTGTGGTATGGCTGTGCAGGTCGTAAATCA	5280
Sbjct	5221	ATGCTTCTGGCGTCAGGCAGCCATCGGAAGCTGTGGTATGGCTGTGCAGGTCGTAAATCA	5280
Query	5281	CTGCATAATTTCGTGTCGCTCAAGGCGCACTCCCGTTCTGGATAATGTTTTTTCGCGCCGAC	5340
Sbjct	5281	CTGCATAATTTCGTGTCGCTCAAGGCGCACTCCCGTTCTGGATAATGTTTTTTCGCGCCGAC	5340
Query	5341	ATCATAACGGTTCTGGCAAATATTCTGAAATGAGCTGTTGACAATTAATCATCGGCTCGT	5400
Sbjct	5341	ATCATAACGGTTCTGGCAAATATTCTGAAATGAGCTGTTGACAATTAATCATCGGCTCGT	5400
Query	5401	ATAATGTGTGGAATTGTGAGCGGATAACAATTTACACAGGAAACA	5446
Sbjct	5401	ATAATGTGTGGAATTGTGAGCGGATAACAATTTACACAGGAAACA	5446

**Alignment between SEQ ID NO:3 from '777 and instant SEQ ID NO:3:**

Query	1	ATGAGAGTGATTTCGCGTGGGTACCCGCAAGAGCCAGCTTGCTCGCATACAGACGGACAGT       	60
Sbjct	1	ATGAGAGTGATTTCGCGTGGGTACCCGCAAGAGCCAGCTTGCTCGCATACAGACGGACAGT       	60
Query	61	GTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTTGAAATCATTGCTATGTCC       	120
Sbjct	61	GTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTTGAAATCATTGCTATGTCC       	120
Query	121	ACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATTGGAGAGAAAAGCCTGTTT       	180
Sbjct	121	ACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATTGGAGAGAAAAGCCTGTTT       	180
Query	181	ACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGACCTGGTTGTTCACTCCTTG       	240
Sbjct	181	ACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGACCTGGTTGTTCACTCCTTG       	240
Query	241	AAGGACCTGCCCACTGTGCTTCCTCCTGGCTTCACCATCGGAGCCATCTGCAAGCGGGAA       	300
Sbjct	241	AAGGACCTGCCCACTGTGCTTCCTCCTGGCTTCACCATCGGAGCCATCTGCAAGCGGGAA       	300
Query	301	AACCCTCATGATGCTGTTGTCTTTCACCCAAAATTTGTTGGGAAGACCCTAGAAACCCTG       	360
Sbjct	301	AACCCTCATGATGCTGTTGTCTTTCACCCAAAATTTGTTGGGAAGACCCTAGAAACCCTG       	360
Query	361	CCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCAGCCCAGCTGCAGAGAAAG       	420
Sbjct	361	CCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCAGCCCAGCTGCAGAGAAAG       	420
Query	421	TTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAACACCCGGCTTCGGAAGCTG       	480
Sbjct	421	TTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAACACCCGGCTTCGGAAGCTG       	480
Query	481	GACGAGCAGCAGGAGTTCA GTGCCATCATCCTGGCAACAGCTGGCCTGCAGCGCATGGGC       	540
Sbjct	481	GACGAGCAGCAGGAGTTCA GTGCCATCATCCTGGCAACAGCTGGCCTGCAGCGCATGGGC       	540
Query	541	TGGCACAAACCGGGTTGGGCAGATCCTGCACCCTGAGGAATGCATGTATGCTGTGGGCCAG       	600
Sbjct	541	TGGCACAAACCGGGTTGGGCAGATCCTGCACCCTGAGGAATGCATGTATGCTGTGGGCCAG       	600
Query	601	GGGGCCTTGGGCGTGGAAGTGCGAGCCAAGGACCAGGACATCTTGGATCTGGTGGGTGTG       	660
Sbjct	601	GGGGCCTTGGGCGTGGAAGTGCGAGCCAAGGACCAGGACATCTTGGATCTGGTGGGTGTG       	660
Query	661	CTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGGGCCTTCTGAGGCACCTG       	720
Sbjct	661	CTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGGGCCTTCTGAGGCACCTG       	720
Query	721	GAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATGAAGGATGGGCAACTGTAC       	780

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Sbjct	721	GAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATGAAGGATGGGCAACTGTAC	780
Query	781	CTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATACAAGAGACCATGCAGGCT	840
Sbjct	781	CTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATACAAGAGACCATGCAGGCT	840
Query	841	ACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGATGACCCACAGTTGGTAGGC	900
Sbjct	841	ACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGATGACCCACAGTTGGTAGGC	900
Query	901	ATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCCCAGAACTTGGGCATCAGC	960
Sbjct	901	ATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCCCAGAACTTGGGCATCAGC	960
Query	961	CTGGCCAACTTGTTGCTGAGCAAAGGAGCCAAAAACATCCTGGATGTTGCACGGCAATTG	1020
Sbjct	961	CTGGCCAACTTGTTGCTGAGCAAAGGAGCCAAAAACATCCTGGATGTTGCACGGCAATTG	1020
Query	1021	AACGATGCCCATTAA	1035
Sbjct	1021	AACGATGCCCATTAA	1035



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**Alignment between SEQ ID NO:4 from '777 and instant SEQ ID NO:4:**

Query	1	CACACAGCCTACTTTCCAAGCGGAGCCATGTCTGGTAACGGCAATGCGGCTGCAACGGCG	60
Sbjct	1	CACACAGCCTACTTTCCAAGCGGAGCCATGTCTGGTAACGGCAATGCGGCTGCAACGGCG	60
Query	61	GAAGAAAACAGCCCAAAGATGAGAGTGATTGCGGTGGGTACCCGCAAGAGCCAGCTTGCT	120
Sbjct	61	GAAGAAAACAGCCCAAAGATGAGAGTGATTGCGGTGGGTACCCGCAAGAGCCAGCTTGCT	120
Query	121	CGCATACAGACGGACAGTGTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTT	180
Sbjct	121	CGCATACAGACGGACAGTGTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTT	180
Query	181	GAAATCATTGCTATGTCCACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATT	240
Sbjct	181	GAAATCATTGCTATGTCCACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATT	240
Query	241	GGAGAGAAAAGCCTGTTTACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGAC	300
Sbjct	241	GGAGAGAAAAGCCTGTTTACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGAC	300
Query	301	CTGGTTGTTCACTCCTTGAAGGACCTGCCCACTGTGCTTCCTCCTGGCTTCACCATCGGA	360
Sbjct	301	CTGGTTGTTCACTCCTTGAAGGACCTGCCCACTGTGCTTCCTCCTGGCTTCACCATCGGA	360
Query	361	GCCATCTGCAAGCGGGAAAACCTCATGATGCTGTTGTCTTTCACCCAAAATTTGTTGGG	420
Sbjct	361	GCCATCTGCAAGCGGGAAAACCTCATGATGCTGTTGTCTTTCACCCAAAATTTGTTGGG	420
Query	421	AAGACCCTAGAAACCTTGCCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCA	480
Sbjct	421	AAGACCCTAGAAACCTTGCCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCA	480
Query	481	GCCCAGCTGCAGAGAAAGTTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAAC	540
Sbjct	481	GCCCAGCTGCAGAGAAAGTTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAAC	540
Query	541	ACCCGGCTTCGGAAGCTGGACGAGCAGCAGGAGTTCAGTGCCATCATCTGGCAACAGCT	600
Sbjct	541	ACCCGGCTTCGGAAGCTGGACGAGCAGCAGGAGTTCAGTGCCATCATCTGGCAACAGCT	600
Query	601	GGCCTGCAGCGCATGGGCTGGCACAACCGGGTTGGGCAGATCCTGCACCCTGAGGAATGC	660
Sbjct	601	GGCCTGCAGCGCATGGGCTGGCACAACCGGGTTGGGCAGATCCTGCACCCTGAGGAATGC	660
Query	661	ATGTATGCTGTGGGCCAGGGGGCCTTGGGCGTGGAAGTGCAGGCCAAGGACCAGGACATC	720
Sbjct	661	ATGTATGCTGTGGGCCAGGGGGCCTTGGGCGTGGAAGTGCAGGCCAAGGACCAGGACATC	720
Query	721	TTGGATCTGGTGGGTGTGCTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGG	780
Sbjct	721	TTGGATCTGGTGGGTGTGCTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGG	780

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Query	781	GCCTTCCTGAGGCACCTGGAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATG	840
Sbjct	781	GCCTTCCTGAGGCACCTGGAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATG	840
Query	841	AAGGATGGGCAACTGTACCTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATA	900
Sbjct	841	AAGGATGGGCAACTGTACCTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATA	900
Query	901	CAAGAGACCATGCAGGCTACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGAT	960
Sbjct	901	CAAGAGACCATGCAGGCTACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGAT	960
Query	961	GACCCACAGTTGGTAGGCATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCC	1020
Sbjct	961	GACCCACAGTTGGTAGGCATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCC	1020
Query	1021	CAGAACTTGGGCATCAGCCTGGCCAACCTTGTGTGCTGAGCAAAGGAGCCAAAAACATCCTG	1080
Sbjct	1021	CAGAACTTGGGCATCAGCCTGGCCAACCTTGTGTGCTGAGCAAAGGAGCCAAAAACATCCTG	1080
Query	1081	GATGTTGCACGGCAATTGAACGATGCCCATTAA	1113
Sbjct	1081	GATGTTGCACGGCAATTGAACGATGCCCATTAA	1113

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**Alignment of instant SEQ ID NOS: 3 and 4.**

Query	1	ATGAGAGTGATTTCGCGTGGGTACCCGCAAGAGCCAGCTTGCTCGCATACAGACGGACAGT	60
Sbjct	79	ATGAGAGTGATTTCGCGTGGGTACCCGCAAGAGCCAGCTTGCTCGCATACAGACGGACAGT	138
Query	61	GTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTTGAAATCATTGCTATGTCC	120
Sbjct	139	GTGGTGGCAACATTGAAAGCCTCGTACCCTGGCCTGCAGTTTGAAATCATTGCTATGTCC	198
Query	121	ACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATTGGAGAGAAAAGCCTGTTT	180
Sbjct	199	ACCACAGGGGACAAGATTCTTGATACTGCACTCTCTAAGATTGGAGAGAAAAGCCTGTTT	258
Query	181	ACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGACCTGGTTGTTCACCTCCTTG	240
Sbjct	259	ACCAAGGAGCTTGAACATGCCCTGGAGAAGAATGAAGTGGACCTGGTTGTTCACCTCCTTG	318
Query	241	AAGGACCTGCCCACCTGTGCTTCCTCCTGGCTTCACCATCGGAGCCATCTGCAAGCGGGAA	300
Sbjct	319	AAGGACCTGCCCACCTGTGCTTCCTCCTGGCTTCACCATCGGAGCCATCTGCAAGCGGGAA	378
Query	301	AACCCTCATGATGCTGTTGTCTTTACCCAAAATTTGTTGGGAAGACCCTAGAAACCCCTG	360
Sbjct	379	AACCCTCATGATGCTGTTGTCTTTACCCAAAATTTGTTGGGAAGACCCTAGAAACCCCTG	438
Query	361	CCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCAGCCAGCTGCAGAGAAAG	420
Sbjct	439	CCAGAGAAGAGTGTGGTGGGAACCAGCTCCCTGCGAAGAGCAGCCAGCTGCAGAGAAAG	498
Query	421	TTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAACACCCGGCTTCGGAAGCTG	480
Sbjct	499	TTCCCGCATCTGGAGTTCAGGAGTATTCGGGGAAACCTCAACACCCGGCTTCGGAAGCTG	558
Query	481	GACGAGCAGCAGGAGTTCAAGTCCATCATCCTGGCAACAGCTGGCCTGCAGCGCATGGGC	540
Sbjct	559	GACGAGCAGCAGGAGTTCAAGTCCATCATCCTGGCAACAGCTGGCCTGCAGCGCATGGGC	618
Query	541	TGGCACAACCGGGTTGGGCAGATCCTGCACCCCTGAGGAATGCATGTATGCTGTGGGCCAG	600
Sbjct	619	TGGCACAACCGGGTTGGGCAGATCCTGCACCCCTGAGGAATGCATGTATGCTGTGGGCCAG	678
Query	601	GGGGCCTTGGGCGTGGAAGTGCAGAGCCAAGGACCAGGACATCTTGGATCTGGTGGGTGTG	660
Sbjct	679	GGGGCCTTGGGCGTGGAAGTGCAGAGCCAAGGACCAGGACATCTTGGATCTGGTGGGTGTG	738
Query	661	CTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGGGCCTTCCTGAGGCACCTG	720
Sbjct	739	CTGCACGATCCCGAGACTCTGCTTCGCTGCATCGCTGAAAGGGCCTTCCTGAGGCACCTG	798
Query	721	GAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATGAAGGATGGGCAACTGTAC	780
Sbjct	799	GAAGGAGGCTGCAGTGTGCCAGTAGCCGTGCATACAGCTATGAAGGATGGGCAACTGTAC	858

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Query	781	CTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATACAAGAGACCATGCAGGCT	840
Sbjct	859	CTGACTGGAGGAGTCTGGAGTCTAGACGGCTCAGATAGCATACAAGAGACCATGCAGGCT	918
Query	841	ACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGATGACCCACAGTTGGTAGGC	900
Sbjct	919	ACCATCCATGTCCCTGCCCAGCATGAAGATGGCCCTGAGGATGACCCACAGTTGGTAGGC	978
Query	901	ATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCCCAGAACTTGGGCATCAGC	960
Sbjct	979	ATCACTGCTCGTAACATTCCACGAGGGCCCCAGTTGGCTGCCCAGAACTTGGGCATCAGC	1038
Query	961	CTGGCCAACTTGTTGCTGAGCAAAGGAGCCAAAAACATCCTGGATGTTGCACGGCAATTG	1020
Sbjct	1039	CTGGCCAACTTGTTGCTGAGCAAAGGAGCCAAAAACATCCTGGATGTTGCACGGCAATTG	1098
Query	1021	AACGATGCCCATTAA	1035
Sbjct	1099	AACGATGCCCATTAA	1113